Tahoe Sierra IRWMP

Attachment #7

Economic Analysis – Water Supply Costs and Benefits

Table 11- Annual Cost of Project

(All costs should be in 2009 Dollars)

Project: Project 1 - Community Watershed Planning - Tahoe Resource Conservation District

	Initial Costs	Operations and Maintenance Costs [1]						Discounting Calculations	
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
YEAR	Grand Total Cost From Table 7 (row (i), column(d))	Admin	Operation	Maintenance	Replacement	Other	Total Costs (a) +...+ (f)	Discount Factor	Discounted Costs(g) x (h)
2009	$450,000	$0	$0	$0	$0	$0	$450,000	1.000	$450,000
2010	$0	$0	$0	$0	$0	$0	$0	0.943	$0
2011	$0	$0	$0	$0	$0	$0	$0	0.890	$0
2012	$0	$0	$0	$0	$0	$0	$0	0.840	$0
2013	$0	$0	$0	$0	$0	$0	$0	0.792	$0
2014	$0	$0	$0	$0	$0	$0	$0	0.747	$0
2015	$0	$0	$0	$0	$0	$0	$0	0.705	$0
2016	$0	$0	$0	$0	$0	$0	$0	0.665	$0
2017	$0	$0	$0	$0	$0	$0	$0	0.627	$0
2018	$0	$0	$0	$0	$0	$0	$0	0.592	$0
2019	$0	$0	$0	$0	$0	$0	$0	0.558	$0
2020	$0	$0	$0	$0	$0	$0	$0	0.527	$0
2021	$0	$0	$0	$0	$0	$0	$0	0.497	$0
2022	$0	$0	$0	$0	$0	$0	$0	0.469	$0
2023	$0	$0	$0	$0	$0	$0	$0	0.442	$0
2024	$0	$0	$0	$0	$0	$0	$0	0.417	$0
2025	$0	$0	$0	$0	$0	$0	$0	0.394	$0
2026	$0	$0	$0	$0	$0	$0	$0	0.371	$0
2027	$0	$0	$0	$0	$0	$0	$0	0.350	$0
2028	$0	$0	$0	$0	$0	$0	$0	0.331	$0
2029	$0	$0	$0	$0	$0	$0	$0	0.312	$0
2030	$0	$0	$0	$0	$0	$0	$0	0.294	$0
2031	$0	$0	$0	$0	$0	$0	$0	0.278	$0
Project Life									
							Total Present Value of Discounted Costs (Sum of Column (i))		$450,000
							Transfer to Table 20, column (c), Exhibit F: Proposal Costs and Benefits Summaries		

Comments: There are no operations and maintenance costs beyond the two years of project implementation as these costs will fall on the program recipients.

Table 11- Annual Cost of Project

(All costs should be in 2009 Dollars)

Project: Project 2 - Water Quality Monitoring Program - Town of Truckee

	Initial Costs	Operations and Maintenance Costs [1]						Discounting Calculations	
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
YEAR	Grand Total Cost From Table 7 (row (i), column(d))	Admin	Operation	Maintenance	Replacement	Other	Total Costs (a) +...+ (f)	Discount Factor	Discounted Costs(g) x (h)
2009	$778,750	$0					$778,750	1.000	$778,750
2010	$0						$0	0.943	$0
2011	$0						$0	0.890	$0
2012	$0						$0	0.840	$0
2013	0						0	0.792	0
2014	0						0	0.747	0
Project Life								...	
								Total Present Value of Discounted Costs (Sum of Column (i))	$778,750
								Transfer to Table 20, column (c), Exhibit F: Proposal Costs and Benefits Summaries	

Comments:

Table 11- Annual Cost of Project

(All costs should be in 2009 Dollars)

Project: Project 3 - Little Truckee River Restoration Project - Sierra County

	Initial Costs	Operations and Maintenance Costs [1]						Discounting Calculations	
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
YEAR	Grand Total Cost From Table 7 (row (i), column(d))	Admin	Operation	Maintenance	Replacement	Other	Total Costs (a) +...+ (f)	Discount Factor	Discounted Costs(g) x (h)
2009							$0	1.000	$0
2010							$0	0.943	$0
2011							$0	0.890	$0
2012	$8,000		$22,000	$80			$30,080	0.840	$25,267
2013	$2,090,794		$22,000	$5,227			$2,118,021	0.792	$1,677,473
2014			$22,000	$5,227			$27,227	0.747	$20,339
2015			$22,000	$5,227			$27,227	0.705	$19,195
2016			$22,000	$5,227			$27,227	0.665	$18,106
2017		$1,000.00	$22,000	$5,227			$28,227	0.627	$17,698
2018			$22,000	$5,227			$27,227	0.592	$16,118
2019			$22,000	$5,227			$27,227	0.558	$15,193
2020			$22,000	$5,227			$27,227	0.527	$14,349
2021			$22,000	$5,227			$27,227	0.497	$13,532
2022		$1,000.00	$22,000	$5,227			$28,227	0.469	$13,238
2023			$22,000	$5,227			$27,227	0.442	$12,034
2024			$22,000	$5,227			$27,227	0.417	$11,354
2025			$22,000	$5,227			$27,227	0.394	$10,727
2026			$22,000	$5,227			$27,227	0.371	$10,101
2027		$1,000.00	$22,000	$5,227			$28,227	0.35	$9,879
2028			$22,000	$5,227			$27,227	0.331	$9,012
2029			$22,000	$5,227			$27,227	0.312	$8,495
2030			$22,000	$5,227			$27,227	0.294	$8,005
2031			$22,000	$5,227			$27,227	0.278	$7,569
2032		$1,000.00	$22,000	$5,227			$28,227	0.262	$7,395
2033			$22,000	$5,227			$27,227	0.247	$6,725
2034			$22,000	$5,227			$27,227	0.233	$6,344
2035			$22,000	$5,227			$27,227	0.22	$5,990
2036			$22,000	$5,227			$27,227	0.207	$5,636
2027		$1,000.00	$22,000	$5,227			$28,227	0.196	$5,532
2038			$22,000	$5,227			$27,227	0.185	$5,037
2039			$22,000	$5,227			$27,227	0.174	$4,737
2040			$22,000	$5,227			$27,227	0.164	$4,465
2041			$22,000	$5,227			$27,227	0.155	$4,220
2042		$1,000.00	$22,000	$5,227			$28,227	0.146	$4,121
2043			$22,000	$5,227	$8,000.00		$35,227	0.138	$4,861
2044			$22,000	$5,227			$27,227	0.13	$3,540
2045			$22,000	$5,227			$27,227	0.123	$3,349
Project Life								...	
							Total Present Value of Discounted Costs (Sum of Column (i))		$2,009,638
							Transfer to Table 20, column (c), Exhibit F: Proposal Costs and Benefits Summaries		

Comments:

Table 11- Annual Cost of Project

(All costs should be in 2009 Dollars)

Project: Project 4 - Negro Canyon Restoration Project - Truckee River Watershed Council

	Initial Costs	Operations and Maintenance Costs [1]						Discounting Calculations	
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
YEAR	Grand Total Cost From Table 7 (row (i), column(d))	Admin	Operation	Maintenance	Replacement	Other	Total Costs (a) +...+ (f)	Discount Factor	Discounted Costs(g) x (h)
2011	$554,355	$0	$0	$0	$0	$0	$554,355	0.890	$493,376
2012	$0	$0	$0	$0	$0	$0	$0	0.840	$0
2013	0	$0	$0	$0	$0	$0	$0	0.792	$0
2014	0	$0	$0	$0	$0	$0	$0	0.747	$0
Project Life									
							Total Present Value of Discounted Costs (Sum of Column (i))		$493,376
							Transfer to Table 20, column (c), Exhibit F: Proposal Costs and Benefits Summaries		

Comments: 1) This table is being completed for the Negro Canyon Restoration Project, a project with water quality benefits, so that we have a "Total Present Value of Discounted Costs" for use in Table 20 Project Costs and Benefits Summary. 2) 2012 adb 2013 costs are included in the Grand Total Cost from Table 7.

Table 11- Annual Cost of Project

(All costs should be in 2009 Dollars)

Project: Project 5 - Water Conservation - South Tahoe Public Utility District (and other agencies)

	Initial Costs	Operations and Maintenance Costs [1]						Discounting Calculations	
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
YEAR	Grand Total Cost From Table 7 (row (i), column(d))	Admin	Operation	Maintenance	Replacement	Other	Total Costs (a) +...+ (f)	Discount Factor	Discounted Costs(g) x (h)
2009	$275,502	$0	$0	$0	$0	$0	$275,502	1.000	$275,502
2010	$275,502	$0	$0	$0	$0	$0	$275,502	0.943	$259,798
2011	$0	$0	$0	$0	$0	$0	$0	0.890	$0
2012	$0	$0	$0	$0	$0	$0	$0	0.840	$0
2013	$0	$0	$0	$0	$0	$0	$0	0.792	$0
2014	$0	$0	$0	$0	$0	$0	$0	0.747	$0
2015	$0	$0	$0	$0	$0	$0	$0	0.705	$0
2016	$0	$0	$0	$0	$0	$0	$0	0.665	$0
2017	$0	$0	$0	$0	$0	$0	$0	0.627	$0
2018	$0	$0	$0	$0	$0	$0	$0	0.592	$0
2019	$0	$0	$0	$0	$0	$0	$0	0.558	$0
2020	$0	$0	$0	$0	$0	$0	$0	0.527	$0
2021	$0	$0	$0	$0	$0	$0	$0	0.497	$0
2022	$0	$0	$0	$0	$0	$0	$0	0.469	$0
2023	$0	$0	$0	$0	$0	$0	$0	0.442	$0
2024	$0	$0	$0	$0	$0	$0	$0	0.417	$0
2025	$0	$0	$0	$0	$0	$0	$0	0.394	$0
2026	$0	$0	$0	$0	$0	$0	$0	0.371	$0
2027	$0	$0	$0	$0	$0	$0	$0	0.35	$0
2028	$0	$0	$0	$0	$0	$0	$0	0.331	$0
2029	$0	$0	$0	$0	$0	$0	$0	0.312	$0
2030	$0	$0	$0	$0	$0	$0	$0	0.294	$0
2031	$0	$0	$0	$0	$0	$0	$0	0.278	$0
Project Life								...	
								Total Present Value of Discounted Costs (Sum of Column (i))	$535,300
								Transfer to Table 20, column (c), Exhibit F: Proposal Costs and Benefits Summaries	

Comments: There are no operations and maintenance costs beyond the two years of project implementation as these costs will fall on the program recipients.

Table 12 - Annual Water Supply Benefits

(All benefits should be in 2009 dollars)

Project: Project 5 - Water Conservation - South Tahoe Public Utility District (and other agencies)

(a) Year	(b) Type of Benefit	(c) Measure of Benefit (Units)	(d) Without Project	(e) With Project	(f) Change Resulting from Project (e) – (d)	(g) Unit $ Value (1)	(h) Annual $ Value (f) x (g) (1)	(i) Discount Factor (1)	(j) Discounted Benefits (h) x (i) (1)
2009					-		$0	1.000	$0
2010					-		$0	0.943	$0
2011	Turf Buyback	gallons	0	2,666,422	2,666,422	$0.002	$6,133	0.890	$5,458
	HE Toilet	gallons	0	1,537,380	1,537,380	$0.002	$3,536	0.890	$3,147
	He Clothes Washer	gallons	0	172,910	172,910	$0.002	$398	0.890	$354
	Customer Leak Repair	gallons	0	1,622,500	1,622,500	$0.002	$3,732	0.890	$3,321
2012	Turf Buyback	gallons	0	5,332,844	5,332,844	$0.002	$12,266	0.840	$10,303
	HE Toilet	gallons		3,074,760	3,074,760	$0.002	$7,072	0.840	$5,940
	He Clothes Washer	gallons	0	345,821	345,821	$0.002	$795	0.840	$668
	Customer Leak Repair	gallons	0	3,245,000	3,245,000	$0.002	$7,464	0.840	$6,269
2013	Turf Buyback	gallons	0	5,332,844	5,332,844	$0.002	$12,266	0.792	$9,714
	HE Toilet	gallons	0	3,074,760	3,074,760	$0.002	$7,072	0.792	$5,601
	He Clothes Washer	gallons	0	345,821	345,821	$0.002	$795	0.792	$630
	Customer Leak Repair	gallons	0	3,245,000	3,245,000	$0.002	$7,464	0.792	$5,911
2014	Turf Buyback	gallons	0	5,332,844	5,332,844	$0.002	$12,266	0.747	$9,162
	HE Toilet	gallons	0	3,074,760	3,074,760	$0.002	$7,072	0.747	$5,283
	He Clothes Washer	gallons	0	345,821	345,821	$0.002	$795	0.747	$594
	Customer Leak Repair	gallons	0	3,245,000	3,245,000	$0.002	$7,464	0.747	$5,575
2015	Turf Buyback	gallons	0	5,332,844	5,332,844	$0.002	$12,266	0.705	$8,647
	HE Toilet	gallons	0	3,074,760	3,074,760	$0.002	$7,072	0.705	$4,986
	He Clothes Washer	gallons	0	345,821	345,821	$0.002	$795	0.705	$561
	Customer Leak Repair	gallons	0	3,245,000	3,245,000	$0.002	$7,464	0.705	$5,262
2016	Turf Buyback	gallons	0	5,332,844	5,332,844	$0.002	$12,266	0.665	$8,157
	HE Toilet	gallons	0	3,074,760	3,074,760	$0.002	$7,072	0.665	$4,703
	He Clothes Washer	gallons	0	345,821	345,821	$0.002	$795	0.665	$529
	Customer Leak Repair	gallons	0	3,245,000	3,245,000	$0.002	$7,464	0.665	$4,963
2017	Turf Buyback	gallons	0	5,332,844	5,332,844	$0.002	$12,266	0.627	$7,690
	HE Toilet	gallons	0	3,074,760	3,074,760	$0.002	$7,072	0.627	$4,434
	He Clothes Washer	gallons	0	345,821	345,821	$0.002	$795	0.627	$499
	Customer Leak Repair	gallons	0	3,245,000	3,245,000	$0.002	$7,464	0.627	$4,680
2018	Turf Buyback	gallons	0	5,332,844	5,332,844	$0.002	$12,266	0.592	$7,261
	HE Toilet	gallons	0	3,074,760	3,074,760	$0.002	$7,072	0.592	$4,187
	He Clothes Washer	gallons	0	345,821	345,821	$0.002	$795	0.592	$471
	Customer Leak Repair	gallons	0	3,245,000	3,245,000	$0.002	$7,464	0.592	$4,418
2019	Turf Buyback	gallons	0	5,332,844	5,332,844	$0.002	$12,266	0.558	$6,844
	HE Toilet	gallons	0	3,074,760	3,074,760	$0.002	$7,072	0.558	$3,946
	He Clothes Washer	gallons	0	345,821	345,821	$0.002	$795	0.558	$444
	Customer Leak Repair	gallons	0	3,245,000	3,245,000	$0.002	$7,464	0.558	$4,165
2020	Turf Buyback	gallons	0	5,332,844	5,332,844	$0.002	$12,266	0.527	$6,464
	HE Toilet	gallons	0	3,074,760	3,074,760	$0.002	$7,072	0.527	$3,727
	He Clothes Washer	gallons	0	345,821	345,821	$0.002	$795	0.527	$419
	Customer Leak Repair	gallons	0	3,245,000	3,245,000	$0.002	$7,464	0.527	$3,933
2021	Turf Buyback	gallons	0	5,332,844	5,332,844	$0.003	$15,999	0.497	$7,951
	HE Toilet	gallons	0	3,074,760	3,074,760	$0.003	$9,224	0.497	$4,584
	He Clothes Washer	gallons	0	345,821	345,821	$0.003	$1,037	0.497	$516
	Customer Leak Repair	gallons	0	3,245,000	3,245,000	$0.003	$9,735	0.497	$4,838

2022	Turf Buyback	gallons	0	5,332,844	5,332,844	$0.003	$15,999	0.469	$7,503
	HE Toilet	gallons	0	3,074,760	3,074,760	$0.003	$9,224	0.469	$4,326
	He Clothes Washer	gallons	0	345,821	345,821	$0.003	$1,037	0.469	$487
	Customer Leak Repair	gallons	0	3,245,000	3,245,000	$0.003	$9,735	0.469	$4,566
2023	Turf Buyback	gallons	0	5,332,844	5,332,844	$0.003	$15,999	0.442	$7,071
	HE Toilet	gallons	0	3,074,760	3,074,760	$0.003	$9,224	0.442	$4,077
	Customer Leak Repair	gallons	0	3,245,000	3,245,000	$0.003	$9,735	0.442	$4,303
2024	Turf Buyback	gallons	0	5,332,844	5,332,844	$0.003	$15,999	0.417	$6,671
	HE Toilet	gallons	0	3,074,760	3,074,760	$0.003	$9,224	0.417	$3,847
	Customer Leak Repair	gallons	0	3,245,000	3,245,000	$0.003	$9,735	0.417	$4,059
2025	Turf Buyback	gallons	0	5,332,844	5,332,844	$0.003	$15,999	0.394	$6,303
	HE Toilet	gallons	0	3,074,760	3,074,760	$0.003	$9,224	0.394	$3,634
	Customer Leak Repair	gallons	0	3,245,000	3,245,000	$0.003	$9,735	0.394	$3,836
2026	Turf Buyback	gallons	0	5,332,844	5,332,844	$0.003	$15,999	0.371	$5,935
	HE Toilet	gallons	0	3,074,760	3,074,760	$0.003	$9,224	0.371	$3,422
	Customer Leak Repair	gallons	0	3,245,000	3,245,000	$0.003	$9,735	0.371	$3,612
2027	Turf Buyback	gallons	0	5,332,844	5,332,844	$0.003	$15,999	0.350	$5,599
	HE Toilet	gallons	0	3,074,760	3,074,760	$0.003	$9,224	0.350	$3,228
	Customer Leak Repair	gallons	0	3,245,000	3,245,000	$0.003	$9,735	0.350	$3,407
2028	Turf Buyback	gallons	0	5,332,844	5,332,844	$0.003	$15,999	0.331	$5,296
	HE Toilet	gallons	0	3,074,760	3,074,760	$0.003	$9,224	0.331	$3,053
	Customer Leak Repair	gallons	0	3,245,000	3,245,000	$0.003	$9,735	0.331	$3,222
2029	Turf Buyback	gallons	0	5,332,844	5,332,844	$0.003	$15,999	0.312	$4,992
	HE Toilet	gallons	0	3,074,760	3,074,760	$0.003	$9,224	0.312	$2,878
	Customer Leak Repair	gallons	0	3,245,000	3,245,000	$0.003	$9,735	0.312	$3,037
2030	Turf Buyback	gallons	0	5,332,844	5,332,844	$0.003	$15,999	0.294	$4,704
	HE Toilet	gallons	0	3,074,760	3,074,760	$0.003	$9,224	0.294	$2,712
	Customer Leak Repair	gallons	0	3,245,000	3,245,000	$0.003	$9,735	0.294	$2,862
2031	Turf Buyback	gallons	0	5,332,844	5,332,844	$0.004	$21,331	0.278	$5,930
	HE Toilet	gallons	0	3,074,760	3,074,760	$0.004	$12,299	0.278	$3,419
	Customer Leak Repair	gallons	0	3,245,000	3,245,000	$0.004	$12,980	0.278	$3,608
2032	Turf Buyback	gallons	0	5,332,844	5,332,844	$0.004	$21,331	0.262	$5,589
2033	Turf Buyback	gallons	0	5,332,844	5,332,844	$0.004	$21,331	0.247	$5,269
2034	Turf Buyback	gallons	0	5,332,844	5,332,844	$0.004	$21,331	0.233	$4,970
2035	Turf Buyback	gallons	0	5,332,844	5,332,844	$0.004	$21,331	0.220	$4,693
2036	Turf Buyback	gallons	0	5,332,844	5,332,844	$0.004	$21,331	0.207	$4,416
2037	Turf Buyback	gallons	0	5,332,844	5,332,844	$0.004	$21,331	0.196	$4,181
2038	Turf Buyback	gallons	0	5,332,844	5,332,844	$0.004	$21,331	0.185	$3,946
2039	Turf Buyback	gallons	0	5,332,844	5,332,844	$0.004	$21,331	0.174	$3,712
2040	Turf Buyback	gallons	0	5,332,844	5,332,844	$0.004	$21,331	0.164	$3,498
2041	Turf Buyback	gallons	0	5,332,844	5,332,844	$0.004	$21,331	0.155	$3,306
Project Life								...	
								Total Present Value of Discounted Benefits Based on Unit Value (Sum of the values in Column (j) for all Benefits shown in table)	**$372,393**

This table was calculated utilizing water savings only. Therefore, the without project category remains zero as without the project, there would be no annual water savings. We anticipate issuing half of the total rebates in 2011 and issuing the remaining rebates in 2012. Turf buy back calculations are based on a water savings of 22 gallons of water per square foot per year as indicated in The Handbook on Water Conservation, by Amy Vickers. (Estimated Turf Buyback rebates is 242,402 sq ft. Life is 30 yrs.) High Efficiency Toilets have an estimated water savings of 23.4 gallons per toilet per day for a single family residence based on the AWWARF Residential End Uses of Water Study, which is recognized by the CUWCC. (Estimated number of HE Toilet Rebates is 360. Life of HE Toilet is 20 yrs.) High Efficiency Clothes Washer water savings estimates are 5085.6 gallons per washer per year based on the BMP and Cost Savings Study prepared for the CUWCC. (Estimated number of HE Washer Rebates is 68. Life of HE Washer is 12 yrs.) The Customer Leak Repair water savings estimates are based on data from the Alliance for Water Efficiency. Water savings from leak repairs ranges from between 2,000 and 20,000 gallons per household per year. The calculation above is based on the mean of 11,000 gallons per year per household. (Estimated number of Customer Leak Repair Rebates is 295. Life is 20 yrs.) The Unit Value for water savings for the first 10 years of the project is $0.002 per gallon, which is based on the average water production costs for the agencies participating in this project. We anticipate the water production cost to rise during the course of the project. We have estimated a cost of $0.003 per gallon for years 11 through 20, and a cost of $0.004 per gallon for years 21 through 30.

Table 15. Total Water Supply Benefits

(All benefits should be in 2009 dollars)

Project: Project 5 - Water Conservation - South Tahoe Public Utility District (and other agencies)

Total Discounted Water Supply Benefits (a)	Total Discounted Avoided Project Costs (b)	Other Discounted Water Supply Benefits (c)	Total Present Value of Discounted Benefits (d) (a) + (c) or (b) + (c)
$372,393.00			$372,393.00

Comments:

Table 11- Annual Cost of Project

(All costs are in 2009 Dollars)

Project: Project 6 - Olympic Valley Creek/Aquifer Interaction Project - Squaw Valley Public Services District

	Initial Costs	Operations and Maintenance Costs [1]						Discounting Calculations	
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
YEAR	Grand Total Cost From Table 7 (row (i), column(d))	Admin	Operation	Maintenance	Replacement	Other	Total Costs (a) +...+ (f)	Discount Factor	Discounted Costs(g) x (h)
2009	$355,580						$355,580	1.000	$355,580
2010							$0	0.943	$0
2011							$0	0.890	$0
2012							$0	0.840	$0
2013							$0	0.792	$0
2014							$0	0.747	$0
2015							$0	0.705	$0
2016							$0	0.665	$0
2017							$0	0.627	$0
2018							$0	0.592	$0
2019							$0	0.558	$0
2020							$0	0.527	$0
Project Life								...	
							Total Present Value of Discounted Costs (Sum of Column (i))		$355,580
							Transfer to Table 20, column (c), Exhibit F: Proposal Costs and Benefits Summaries		

Comments:

Table 12 - Annual Water Supply Benefits

(All benefits are in 2009 dollars)

Project: Project 6 - Olympic Valley Creek Aquifer Interaction Project - Squaw Valley Public Service District

(a) Year	(b) Type of Benefit	(c) Measure of Benefit (Units)	(d) Without Project	(e) With Project	(f) Change Resulting from Project (e) – (d)	(g) Unit $ Value (1)	(h) Annual $ Value (f) x (g) (1)	(i) Discount Factor (1)	(j) Discounted Benefits (h) x (i) (1)
2009	Property Tax Benefits to SVPSD	dollars	$0	$0	0		$0	1.000	$0
	Regional Increase in Visitor Expenditures	dollars	0	0	0		$0	1.000	$0
	Regional Increase in TOT	dollars	0	0	0		$0	1.000	$0
	..								
2010	Property Tax Benefits to SVPSD	dollars	$0	$28,784	$28,784	$1	$28,784	0.943	$27,143
	Regional Increase in Visitor Expenditures	dollars	$0	$0	$0	$1	$0	0.943	$0
	Regional Increase in TOT	dollars	$0	$0	0	$1	$0	0.943	$0
	..								
2011	Property Tax Benefits to SVPSD	dollars	$0	$534,478	$534,478	$1	$534,478	0.890	$475,685
	Regional Increase in Visitor Expenditures	dollars	$0	$24,280,256	$24,280,256	$1	$24,280,256	0.890	$21,609,428
	Regional Increase in TOT	dollars	$0	$753,000	$753,000	$1	$753,000	0.890	$670,170
...	..								
2012	Property Tax Benefits to SVPSD	dollars	$0	$564,132	$564,132	$1	$564,132	0.840	$473,871
	Regional Increase in Visitor Expenditures	dollars	$0	$24,280,256	$24,280,256	$1	$24,280,256	0.840	$20,395,415
	Regional Increase in TOT	dollars	$0	$753,000	$753,000	$1	$753,000	0.840	$632,520
	..								
2013	Property Tax Benefits to SVPSD	dollars	$0	$1,128,354	$1,128,354	$1	$1,128,354	0.792	$893,657
	Regional Increase in Visitor Expenditures	dollars	$0	$48,560,513	$48,560,513	$1	$48,560,513	0.792	$38,459,926
	Regional Increase in TOT	dollars	$0	$1,506,000	$1,506,000	$1	$1,506,000	0.792	$1,192,752
	..								
2014	Property Tax Benefits to SVPSD	dollars	$0	$1,188,392	$1,188,392	$1	$1,188,392	0.747	$887,729
	Regional Increase in Visitor Expenditures	dollars	$0	$48,560,513	$48,560,513	$1	$48,560,513	0.747	$36,274,703
	Regional Increase in TOT	dollars	$0	$1,506,000	$1,506,000	$1	$1,506,000	0.747	$1,124,982
	..								
2015	Property Tax Benefits to SVPSD	dollars	$0	$1,964,813	$1,964,813	$1	$1,964,813	0.705	$1,385,193
	Regional Increase in Visitor Expenditures	dollars	$0	$80,934,188	$80,934,188	$1	$80,934,188	0.705	$57,058,602
	Regional Increase in TOT	dollars	$0	$2,510,000	$2,510,000	$1	$2,510,000	0.705	$1,769,550
	..								
2016	Property Tax Benefits to SVPSD	dollars	$0	$2,027,569	$2,027,569	$1	$2,027,569	0.665	$1,348,334
	Regional Increase in Visitor Expenditures	dollars	$0	$80,934,188	$80,934,188	$1	$80,934,188	0.665	$53,821,235
	Regional Increase in TOT	dollars	$0	$2,510,000	$2,510,000	$1	$2,510,000	0.665	$1,669,150
	..								
2017	Property Tax Benefits to SVPSD	dollars	$0	$2,660,676	$2,660,676	$1	$2,660,676	0.627	$1,668,244
	Regional Increase in Visitor Expenditures	dollars	$0	$105,214,444	$105,214,444	$1	$105,214,444	0.627	$65,969,456
	Regional Increase in TOT	dollars	$0	$3,263,000	$3,263,000	$1	$3,263,000	0.627	$2,045,901
	..								
2018	Property Tax Benefits to SVPSD	dollars	$0	$2,726,289	$2,726,289	$1	$2,726,289	0.592	$1,613,963
	Regional Increase in Visitor Expenditures	dollars	$0	$105,214,444	$105,214,444	$1	$105,214,444	0.592	$62,286,951
	Regional Increase in TOT	dollars	$0	$3,263,000	$3,263,000	$1	$3,263,000	0.592	$1,931,696
	..								
2019	Property Tax Benefits to SVPSD	dollars	$0	$3,396,973	$3,396,973	$1	$3,396,973	0.558	$1,895,511
	Regional Increase in Visitor Expenditures	dollars	$0	$129,494,700	$129,494,700	$1	$129,494,700	0.558	$72,258,043
	Regional Increase in TOT	dollars	$0	$4,016,000	$4,016,000	$1	$4,016,000	0.558	$2,240,928
	..								
2020	Property Tax Benefits to SVPSD	dollars	$0	$3,465,587	$3,465,587	$1	$3,465,587	0.527	$1,826,364
	Regional Increase in Visitor Expenditures	dollars	$0	$129,494,700	$129,494,700	$1	$129,494,700	0.527	$68,243,707
	Regional Increase in TOT	dollars	$0	$4,016,000	$4,016,000	$1	$4,016,000	0.527	$2,116,432
	..								
Project Life								...	
							Total Present Value of Discounted Benefits Based on Unit Value (Sum of the values in Column (j) for all Benefits shown in table)		$524,267,240

Comments:

Table 13 - Annual Costs of Avoided Projects

(All avoided costs are in 2009 dollars)

Project: Olympic Valley Creek Aquifer Interaction Project

	Costs				Discounting Calculations	
(a)	(b)	(c)	(d)	(e)	(f)	(g)
YEAR	Alternative (Avoided Project Name): Water Supply & Treatment (Manganese Dioxide) *Avoided Project Description:* Avoided Capital Costs	Avoided Replacement Costs	Avoided Operations and Maintenance Costs	Total Cost Avoided for Individual Alternatives (b) + (c) + (d)	Discount Factor	Discounted Costs (e) x (f)
2009	$4,105,500			4105500	1.000	$4,105,500
2010		$6,360	$31,800	38160	0.943	$35,985
2011		$6,360	$31,800	38160	0.890	$33,962
2012		$6,360	$31,800	38160	0.840	$32,054
2013		$6,360	$31,800	38160	0.792	$30,223
2014		$6,360	$31,800	38160	0.747	$28,506
2015		$6,360	$31,800	38160	0.705	$26,903
2016		$6,360	$31,800	38160	0.665	$25,376
2017		$6,360	$31,800	38160	0.627	$23,926
2018		$6,360	$31,800	38160	0.592	$22,591
2019		$6,360	$31,800	38160	0.558	$21,293
2020		$6,360	$31,800	38160	0.527	$20,110
...					...	
Project Life				0	...	
					Total Present Value of Discounted Costs (Sum of Column (g))	$4,406,430
					(%) Avoided Cost Claimed by Project	92%
					Total Present Value of Discounted Avoided Project Costs Claimed by alternative Project (Total Present Value of Discounted Costs x % Avoided Cost Claimed by Project)	$4,053,550

Comments:

Source: Squaw Valley PSD, West Yost & Associates "Squaw Valley Groundwater Developemnt & Utilization Feasibility Study Update", August 2003

[1] Alternative Water Supply and Treatment Project Cost Estimate:

Item	Est. Cost, 2002$	Update Factor	Est. Cost, 2009$
2 MGD Water Treatment Plant for Iron & Maganese Removal	$2,875,000	1.19	$3,421,250
Total Construction Cost	**$2,875,000**		**$3,421,250**
Engineering, Legal & Admin @ 20%	$575,000		$684,250
Total Project Cost	**$3,450,000**		**$4,105,500**

	Est. Cost, 2006$	Update Factor	Est. Cost, 2009$
Admin Cost	$6,000	1.06	$6,360
O&M and Replacement	$30,000	1.06	$31,800

[2] Based on April 5, 2006 Technical Memo on Water Treatment Plant Site and Process Evaluation, prepared by ECO:LOGIC Preliminary cost estimate of $30,000 escalated by 3% per year.

Table 15. Total Water Supply Benefits

(All benefits are in 2009 dollars)

Project: Olympic Valley Creek/Aquifer Interaction Project

Total Discounted Water Supply Benefits (a)	Total Discounted Avoided Project Costs (b)	Other Discounted Water Supply Benefits (c)	Total Present Value of Discounted Benefits (d) (a) + (c) or (b) + (c)
$524,267,240	$4,053,550	$0	**$524,267,240**

Comments:

Table 11- Annual Cost of Project

(All costs should be in 2009 Dollars)

Project: Project 7 - Bijou Creek Culvert Replacement Project - City of South Lake Tahoe

	Initial Costs	Operations and Maintenance Costs [1]						Discounting Calculations	
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
YEAR	Grand Total Cost From Table 7 (row (i), column(d))	Admin	Operation	Maintenance	Replacement	Other	Total Costs (a) +...+ (f)	Discount Factor	Discounted Costs(g) x (h)
2009	$3,039,711	$0	$0	$0	$0	$0	$3,039,711	1.000	$3,039,711
2010	$0	$0	$0	$0	$0	$0	$0	0.943	$0
2011	$0	$0	$0	$0	$0	$0	$0	0.890	$0
2012	$0	$0	$0	$0	$0	$0	$0	0.840	$0
2013	$0	$0	$0	$0	$0	$0	$0	0.792	$0
2014	$0	$0	$0	$0	$0	$0	$0	0.747	$0
2015	$0	$0	$0	$0	$0	$0	$0	0.705	$0
2016	$0	$0	$0	$0	$0	$0	$0	0.665	$0
2017	$0	$0	$0	$0	$0	$0	$0	0.627	$0
2018	$0	$0	$0	$0	$0	$0	$0	0.592	$0
2019	$0	$0	$0	$0	$0	$0	$0	0.558	$0
2020	$0	$0	$0	$0	$0	$0	$0	0.527	$0
2021	$0	$0	$0	$0	$0	$0	$0	0.497	$0
2022	$0	$0	$0	$0	$0	$0	$0	0.469	$0
2023	$0	$0	$0	$0	$0	$0	$0	0.442	$0
2024	$0	$0	$0	$0	$0	$0	$0	0.417	$0
2025	$0	$0	$0	$0	$0	$0	$0	0.394	$0
2026	$0	$0	$0	$0	$0	$0	$0	0.371	$0
2027	$0	$0	$0	$0	$0	$0	$0	0.35	$0
2028	$0	$0	$0	$0	$0	$0	$0	0.331	$0
2029	$0	$0	$0	$0	$0	$0	$0	0.312	$0
2030	$0	$0	$0	$0	$0	$0	$0	0.294	$0
2031	$0	$0	$0	$0	$0	$0	$0	0.278	$0
Project Life								...	
							Total Present Value of Discounted Costs (Sum of Column (i))		$3,039,711
							Transfer to Table 20, column (c), Exhibit F: Proposal Costs and Benefits Summaries		

Comments:

Table 11- Annual Cost of Project

(All costs should be in 2009 Dollars)

Project: Project 8 - Montgomery Estates ECP - El Dorado County

	Initial Costs	Operations and Maintenance Costs [1]						Discounting Calculations	
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
YEAR	Grand Total Cost From Table 7 (row (i), column(d))	Admin	Operation	Maintenance	Replacement	Other	Total Costs (a) +...+ (f)	Discount Factor	Discounted Costs(g) x (h)
2009	$499,750	$0	$0	$0	$0	$0	$499,750	1.000	$499,750
2010	$0	$0	$0	$0	$0	$0	$0	0.943	$0
2011	$0	$0	$0	$0	$0	$0	$0	0.890	$0
2012	$0	$0	$0	$0	$0	$0	$0	0.840	$0
2013	$0	$0	$0	$0	$0	$0	$0	0.792	$0
2014	$0	$0	$0	$0	$0	$0	$0	0.747	$0
2015	$0	$0	$0	$0	$0	$0	$0	0.705	$0
2016	$0	$0	$0	$0	$0	$0	$0	0.665	$0
2017	$0	$0	$0	$0	$0	$0	$0	0.627	$0
2018	$0	$0	$0	$0	$0	$0	$0	0.592	$0
2019	$0	$0	$0	$0	$0	$0	$0	0.558	$0
2020	$0	$0	$0	$0	$0	$0	$0	0.527	$0
2021	$0	$0	$0	$0	$0	$0	$0	0.497	$0
2022	$0	$0	$0	$0	$0	$0	$0	0.469	$0
2023	$0	$0	$0	$0	$0	$0	$0	0.442	$0
2024	$0	$0	$0	$0	$0	$0	$0	0.417	$0
2025	$0	$0	$0	$0	$0	$0	$0	0.394	$0
2026	$0	$0	$0	$0	$0	$0	$0	0.371	$0
2027	$0	$0	$0	$0	$0	$0	$0	0.35	$0
2028	$0	$0	$0	$0	$0	$0	$0	0.331	$0
2029	$0	$0	$0	$0	$0	$0	$0	0.312	$0
2030	$0	$0	$0	$0	$0	$0	$0	0.294	$0
2031	$0	$0	$0	$0	$0	$0	$0	0.278	$0
Project Life								...	
							Total Present Value of Discounted Costs (Sum of Column (i))		$499,750
							Transfer to Table 20, column (c), Exhibit F: Proposal Costs and Benefits Summaries		

Comments:

Table 11- Annual Cost of Project

(All costs should be in 2009 Dollars)

Project: Project 9 - Griff Creek Water Quality Improvements - Placer County

	Initial Costs	Operations and Maintenance Costs [1]						Discounting Calculations	
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
YEAR	Grand Total Cost From Table 7 (row (i), column(d))	Admin	Operation	Maintenance	Replacement	Other	Total Costs (a) +...+ (f)	Discount Factor	Discounted Costs(g) x (h)
2009	$1,350,000	$0	$0	$0	$0	$0	$1,350,000	1.000	$1,350,000
2010	$0	$0	$0	$0	$0	$0	$0	0.943	$0
2011	$0	$0	$0	$0	$0	$0	$0	0.890	$0
2012	$0	$0	$0	$0	$0	$0	$0	0.840	$0
2013	$0	$0	$0	$0	$0	$0	$0	0.792	$0
2014	$0	$0	$0	$0	$0	$0	$0	0.747	$0
2015	$0	$0	$0	$0	$0	$0	$0	0.705	$0
2016	$0	$0	$0	$0	$0	$0	$0	0.665	$0
2017	$0	$0	$0	$0	$0	$0	$0	0.627	$0
2018	$0	$0	$0	$0	$0	$0	$0	0.592	$0
2019	$0	$0	$0	$0	$0	$0	$0	0.558	$0
2020	$0	$0	$0	$0	$0	$0	$0	0.527	$0
2021	$0	$0	$0	$0	$0	$0	$0	0.497	$0
2022	$0	$0	$0	$0	$0	$0	$0	0.469	$0
2023	$0	$0	$0	$0	$0	$0	$0	0.442	$0
2024	$0	$0	$0	$0	$0	$0	$0	0.417	$0
2025	$0	$0	$0	$0	$0	$0	$0	0.394	$0
2026	$0	$0	$0	$0	$0	$0	$0	0.371	$0
2027	$0	$0	$0	$0	$0	$0	$0	0.35	$0
2028	$0	$0	$0	$0	$0	$0	$0	0.331	$0
2029	$0	$0	$0	$0	$0	$0	$0	0.312	$0
2030	$0	$0	$0	$0	$0	$0	$0	0.294	$0
2031	$0	$0	$0	$0	$0	$0	$0	0.278	$0
Project Life								...	
								Total Present Value of Discounted Costs (Sum of Column (i))	$1,350,000
								Transfer to Table 20, column (c), Exhibit F: Proposal Costs and Benefits Summaries	

Comments:

Table 11- Annual Cost of Project

(All costs should be in 2009 Dollars)

Project: Project 10 - Bunker Water Tank Replacement - Tahoe Public Utility District

	Initial Costs	Operations and Maintenance Costs [1]						Discounting Calculations	
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
YEAR	Grand Total Cost From Table 7 (row (i), column(d))	Admin	Operation	Maintenance	Replacement	Other	Total Costs (a) +...+ (f)	Discount Factor	Discounted Costs(g) x (h)
2009	$2,173,500	$0	$0	$0	$0	$0	$2,173,500	1.000	$2,173,500
2010	$0	$0	$0	$0	$0	$0	$0	0.943	$0
2011	$0	$0	$0	$0	$0	$0	$0	0.890	$0
2012	$0	$0	$0	$0	$0	$0	$0	0.840	$0
2013	$0	$0	$0	$0	$0	$0	$0	0.792	$0
2014	$0	$0	$0	$0	$0	$0	$0	0.747	$0
2015	$0	$0	$0	$0	$0	$0	$0	0.705	$0
2016	$0	$0	$0	$0	$0	$0	$0	0.665	$0
2017	$0	$0	$0	$0	$0	$0	$0	0.627	$0
2018	$0	$0	$0	$0	$0	$0	$0	0.592	$0
2019	$0	$0	$0	$0	$0	$0	$0	0.558	$0
2020	$0	$0	$0	$0	$0	$0	$0	0.527	$0
2021	$0	$0	$0	$0	$0	$0	$0	0.497	$0
2022	$0	$0	$0	$0	$0	$0	$0	0.469	$0
2023	$0	$0	$0	$0	$0	$0	$0	0.442	$0
2024	$0	$0	$0	$0	$0	$0	$0	0.417	$0
2025	$0	$0	$0	$0	$0	$0	$0	0.394	$0
2026	$0	$0	$0	$0	$0	$0	$0	0.371	$0
2027	$0	$0	$0	$0	$0	$0	$0	0.35	$0
2028	$0	$0	$0	$0	$0	$0	$0	0.331	$0
2029	$0	$0	$0	$0	$0	$0	$0	0.312	$0
2030	$0	$0	$0	$0	$0	$0	$0	0.294	$0
2031	$0	$0	$0	$0	$0	$0	$0	0.278	$0
Project Life								...	
							Total Present Value of Discounted Costs (Sum of Column (i))		$2,173,500
							Transfer to Table 20, column (c), Exhibit F: Proposal Costs and Benefits Summaries		

Comments:

Attachment 7

Project 10 – Bunker Water Tank Replacement – Tahoe City Public Utility District

Economic Analysis: Water Supply Costs and Benefits

The Tahoe City Public Utility District (TCPUD) Bunker Water Tank Replacement Project (BWTR) is a water supply enhancement project involving the replacement of a seismically unstable water storage tank with inherent leak issues as well as capacity deficiencies. The 0.5 Million Gallon tank was constructed in the 1950's and is of redwood construction. The tank has long suffered from leakage due to redwood construction issues, bird and animal damage and operation beyond its useful lifespan. A very recent seismic analysis has determined that the current tank does not meet current seismic codes. This fact along with other observed conditions has led to the recommendation of replacement of the tank. Lastly, the current capacity of 0.5 M has been determined to be inadequate to provide the water service area with proper fire flow storage and offers very little operational storage during peak demand months. Tahoe City Public Utility District is not the sole provider of water in the area, and additional capacity will also be required if consolidation or interconnections with other systems occur in the future.

Economic Costs

The economic costs associated with the BWTR are established in Table 7. At this time there are no known opportunity costs, as the project has not had any notable costs to date. Economic costs will include:

Direct Project Administration Costs:	These costs were limited to 5% of the total grant request for the BWTR.
Land Purchase/Easement:	No costs associated with this item anticipated.
Planning/Design/Engineering/ Environmental Documentation:	Costs for this category will include preliminary design work, CEQA and NEPA documentation, engineering design work, plans and specification preparation, and bid document preparation.
Construction/Implementation:	Costs for this category will include physical costs for constructing and completing the project.

Environmental Compliance/Mitigation/ Enhancement: Costs for this category will include potential land coverage mitigation costs, and site and access erosion control enhancements and access road improvements.

Construction Administration: Costs for this category include construction inspection, construction contract administration, contractor billing, change order administration and project close out procedures

Other Costs: Costs for this category include any legal support for the project, and any monitoring or assessment required during construction or initial implementation. One example may include archeological inspections during excavation.

Construction/Implementation Contingency: Costs in this category include any construction items unforeseen during the planning and design phase, additional work due to site conditions or archeological concerns. A 10% contingency was used for this category.

Water Supply Benefits

Avoided Water Supply Projects:

Conservation: Water conservation strategies, specifically elimination of real losses have long been used to add system capacity and avoid future source projects. The BWTR will eliminate significant real water losses due to the current age and condition of the existing tank. Current estimates indicate that water loss of 3-5 MG will be eliminated annually which accounts for approximately 1-2% of the entire production for the system. Although not significant, considering this loss is identified from one facility highlights the need to be corrected. Furthermore, reduction of system real losses increases the beneficial use of overall water produced. The primary focus of this benefit is local, and beneficiaries would include local tax and rate payers. There is very little uncertainty with this benefit as the reduction in water loss is very achievable and immediately received upon completion of the BWTR project. No adverse effects are noted in achieving this benefit. Cost benefits are calculable for this benefit and are included in Table 12.

Consolidation or Interconnection: The TCPUD water system served by the existing Bunker Tank only serves approximately 60% of the connections that are within the capability of being served by the current tank location. The additional 40% of service connections are served primarily by privately owned or mutually owned water purveyors. It is likely that over the next 10-20 years many of these systems will seek consolidation or interconnection with the TCPUD. Many of these systems lack necessary storage and/or backup source capabilities. It is estimated that consolidation or interconnection to TCPUD after the construction of the BWTR will eliminate the need for four individual source projects and two storage projects. The cost of each system individually addressing these needs will likely exceed the cost of the BWTR. The BWTR will be sized to accommodate these anticipated future connections thus eliminating the need for several individual and isolated system improvements to accommodate interconnection or consolidation. This benefit has a local focus but also includes regional benefits due to possible consolidation of water systems under one government agency. There is a level of uncertainty to this benefit because when consolidations or interconnections occur is not readily known. However, history has indicated this trend and it is likely to continue in the coming years, especially as increased regulatory costs to water systems will eventually outweigh the profitability and expertise of many private water system owners. In addition, many regulators have strong positive opinions on the benefits of consolidation or interconnection. No adverse effects are noted in achieving this benefit. Cost benefits are calculable for this benefit and are included in Table 12.

Water Supply Reliability:

Seismic Failure: It has been determined through a technical study that the existing Bunker Water Tank is not constructed to withstand seismic events as defined by existing codes. Failure of the Bunker Water Tank due to a seismic event will have several ramifications including property and environmental damage, but more importantly will compromise the TCPUD's ability to deliver safe and sufficient water supply for an extended period of time. Storage tanks damaged by a seismic event are typically not easily repaired or placed back into service in a timely fashion. Therefore, it is imperative that a storage facility be designed to withstand natural disasters and environmental conditions prevalent in the area. The primary focus of this benefit is local, and beneficiaries would include local tax and rate payers. Whether or not a seismic event, sufficient in magnitude to damage the existing water tank, will occur is clearly uncertain. However, certainty is typically not the basis for seismic design codes and should not apply to this benefit. No adverse effects are noted in achieving this benefit. Cost benefits are not calculable for this benefit.

Fire Suppression: The Lake Tahoe basin has experienced several wildland fires in the last ten years which continue to point out the need for water supply reliability to include adequate fire suppression storage. Finding 18 of "The Emergency California-Nevada Tahoe Basin Fire Commission Report", May 2008 clearly supports the need for enhanced fire flow. Adequate fire suppression storage enhances the ability to mitigate structure fires before they can spread to the wildland, and can also assist in protecting residential neighborhoods from encroaching wildland fires. Gravity storage of fire suppression water is far more reliable and cost effective than constructing additional source capacity or emergency source capacity due to the possibility of mechanical failure and due to long term operation and maintenance costs of source projects. This benefit has a local focus but also includes regional benefits due to the potential mitigation of wildland fire threats as well as environmental and property damage reduction. Private, state and federal lands all stand to benefit from a reduction in wildland fire potential. Similar to seismic events, whether or not a fire event sufficient in magnitude to require the added storage contemplated in the BWTR is clearly uncertain. However, certainty is typically not the basis for fire codes and should not apply to this benefit. No adverse effects are noted in achieving this benefit. Cost benefits are not calculable for this benefit.

Avoided Operation and Maintenance Costs:

- Decreased costs due to reduction in system loss
- Eliminate redundant facilities operated by multiple purveyors
- Minimize long term O&M costs associated with additional sources
- Minimize regional O&M costs associated with other water system projects

Tahoe Sierra IRWMP

Attachment #8

Water Quality and Other Expected Benefits